National Weather Service

La Crosse, Wisconsin

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or Twitter:
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Inside this Issue:

2014 Shareholder's Report

National Weather Service, La Crosse, WI

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mobile web forecast access:
mobile.weather.gov

Weather Information Services that Mean Something

By now, you may have heard the National Weather Service (NWS) talking about "Decision Support Services (DSS)" for weather. But you may not be sure what that means to you.

If you're like most people, you may get your weather information from the local radio or TV station, or perhaps you use the NWS web site to access the *very latest* information. You hear or look at the forecast and consider how it may impact any activities you, your family, or your business may have during that time period.

The forecast can help, for sure. But sometimes, people need more or different information to help them make good decisions. With the help of NWS impact-based DSS information, communities and event managers are more frequently making educated weather-related decisions, with a goal of keeping their citizens or patrons safe. Whether the event includes extreme cold, slippery roads, lightning, high winds, tornadoes, flooding, or any other weather element, *good, timely decisions can save lives*. And sometimes, that may include you or those close to you.

When I was a young manager in the NWS, I was told by one of my forecasters that "we don't even know who uses our forecasts, or even if *anyone* does." While I knew *some* people used our forecasts (e.g., the media), that forecaster was largely right. We didn't know many of our users or, even more importantly, what information they needed, when they needed it, or whether the information we were providing met their information needs.

That forecaster was 20 years ahead of his time. Today, it is our goal - no, our *purpose* - to know what information people want or need and provide it to them in a clear and timely manner. That, is DSS, and it applies to everyone we serve.

In this regard, we are making every effort to provide not just a forecast, but impact-based *information* that helps you make the best weather safety decisions you can, whether for your family, your business, or for a specific event. Please check out and share our social media posts, our web page news stories, and our graphical short term forecasts and recorded briefings. They are there specifically for you!

Example of NWS La Crosse graphical weather story. This type of information supplements our historically traditional routine forecasts.

I welcome your comments regarding how we can provide better weather information for you - whenever, wherever and however you need it!

Glenn R. Lussky
Meteorologist in Charge (MIC)
NWS La Crosse, WI

Decision Support Update

The NWS continues to advance services which assist partner groups in making critical decisions during hazardous weather. This "Decision Support" work and development is a focus at the La Crosse NWS office, and we've added new and enhanced methods to share key information.

Decision Support Webinars: Preceding episodes of potentially hazardous weather, the La Crosse NWS typically schedules a webinar briefing to emergency management and community preparedness groups. Roughly 10 minutes long, these live briefings via the web include a slide set explaining the expected weather and potential impacts planners can expect. In addition, this interaction provides an opportunity for those on the call to ask our meteorologists about specific questions or concerns they may have.

Sample briefing slide from January 3, 2014

Webinars have been used for a number of years, with attendance

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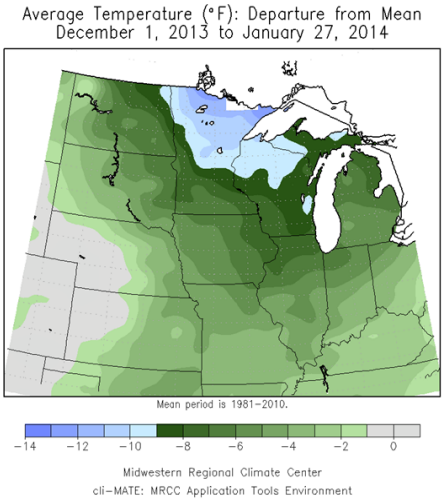
Cold Weather and the Polar Vortex

The winter of 2013-14 has been quite cold across the eastern two-thirds of the United States. Through January. the greatest departures from normal (9 to 14°F below normal) were across Upper Michigan and the northern portions of Minnesota and Wisconsin.

From December 1st through February 6th, this has been the coldest winter at La Crosse, Wisconsin (11.7°F) and Rochester, Minnesota (9.2°F) since 1983-84.



Locales to our north have had an even more extreme winter. During the same period of time, Duluth, Minnesota had an average temperature of 3.0°F. This is almost 10°F below their 1981-2010 normal, and is the 3rd coldest on record (since 1875) for this time period. Only the winters of 1917-18 and 1976-77 were colder. The Twin Cities have averaged 9.8°F (6.7°F below normal). Like La Crosse and Rochester, this has been their coldest weather for this time period in the last 30 years.

While many had never heard of the polar vortex prior to this winter, meteorologists have been well aware of this feature for a very long time (one literature search indicates it was first described in the scientific literature in 1853). In fact, the polar vortex is a centerpiece of the global circulation pattern. It is always there, in one form or another.

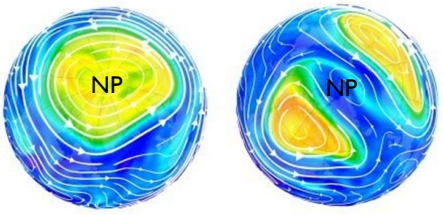
The polar vortex is simply a low pressure area in the upper atmosphere centered generally over the polar regions (both northern and southern hemispheres). The polar vortex is that ring of cold air that sits on the poleward side of the polar jet stream. The associated wind system which surrounds the polar vortex is the westerly mid-latitude jet stream.

By definition, the polar jet stream is located on the periphery of the polar vortex. This jet stream demarks the equatorial extent of the cold arctic air. There are times when the polar vortex is centered near the pole, with most of the very cold air confined to the polar regions. However, there are other times when portions of the polar vortex push southward (often toward the Eurasian or North American land masses), leading to stronger southward intrusions of cold air into those areas. At those times, the pole and other mid-latitude regions typically have warmer than normal conditions as the cold air slides southward.

Any intrusion of very cold air over central North America in winter is simply an extension (or shifting) of the polar vortex into the region. This winter, the polar vortex has shifted substantially over both Siberia (Asia) and North America.

On several occasions this winter, cold air masses originating over Siberia (where the coldest land temperatures are usually observed during the winter) have moved over the North Pole into northern Canada. Under certain flow regimes, these very cold air masses can be transported southward into the central U.S. In seasons where these flow regimes dominate (such as this winter), the result can be a very cold winter for the central U.S.

While this winter has been atypically cold over our area, this isn't something that is due to a new scientific finding. It is simply a manifestation of one particular global circulation pattern which has consistently maintained a cold portion of the polar vortex over our area this winter.



At left, the polar vortex keeps the cold air centered on the pole, with few intrusions of polar air into the mid-latitudes. At right, the polar vortex has split and pushed southward over the main Northern Hemisphere land masses, and warmer than normal air is located over the North Pole (NP).

Social Media Expansion at NWS La Crosse

The past year has featured a significant expansion of social media services that the NWS La Crosse office provides via Facebook, Twitter and YouTube.

Posts to Facebook and Twitter are typically made at least once each day to give a general overview of the most important upcoming weather story. As more significant weather events are forecast (or occur), our activity on these social media sites increases in an effort to communicate as much potentially life-saving information as we can. In that regard, social media can play a crucial role in our entire DSS program, as they help spread impact-based information people need to make good, life-saving decisions.

> ***"Through the power of information sharing, social media provides a great way for us to reach many more people than just those who closely follow the traditional NWS information stream."***

As of February 1, 2014, we had 4,244 Facebook and 1,696 Twitter followers, with new people finding our pages every day. A number of followers post pictures and reports to our pages, which we share with others, especially when inclement weather is occurring. Twitter users can append our hashtag (#nwsarx) to their tweets to alert us of their information. We have also started to use YouTube to post short briefings on upcoming weather events, along with educational and outreach material.

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Social Media (continued from page 2)

Internally, we use the social media dashboard, Hootsuite, to monitor our Facebook and Twitter feeds. We also use Hootsuite (and Tweetdeck) to perform a variety of real-time Twitter searches for key words that are posted from within a 100 mile radius of La Crosse, Wisconsin. These key words include weather-related events such as tornado, damage, blizzard and so on. This gives us an easy method to identify weather-related posts associated with any ongoing weather event, even if those posting the information are not following us.

The social media network can be a very powerful and effective way to share critical, life-saving weather information with family and friends.

One of our most important office goals has always been to reach as many people as possible with critical severe weather, winter storm or other hazardous weather information that they need. Through the power of information sharing, social media provides a way for us to reach many more people than just those who closely follow the traditional NWS information stream. Without a doubt, social media is a powerful and effective way to get important information out to many people, and it also allows those people to share that information with their social media contacts. We encourage our followers to share our information, especially that which could save lives and property.

If you would like to follow us on social media, you can do so via the following locations:

Facebook:
https://www.facebook.com/US.NationalWeatherService.LaCrosse.gov

Twitter:
https://twitter.com/NWSLaCrosse
Twitter Storm Reports to NWS La Crosse: *#nwsarx*

YouTube:
http://www.youtube.com/NWSLaCrosseWI

Web-based Storm Summaries

Did you know the La Crosse NWS office documents and records specifics about larger, more impactful weather in the region? Better yet, did you know this collection of storm summaries goes back to the late 1990s?

Typically, after each significant weather event in the NWS La Crosse service area, staff members collect and archive a variety of meteorological fields and graphics.

Internet web pages are developed that summarize each weather event, including items like simple radar imagery, snowfall maps, damage photos, or listings of actual storm or snow reports.

These summaries are usually included as a news story on our main web site (*weather.gov/lacrosse*) shortly after the events come to an end. We use these summaries as a way to 1) document what happened, 2) help coordinate the information for media and Emergency Management partners, and 3) provide a focus for later review or research to improve our overall services.

You can find the archive of past summaries on our "Storm Summaries" link in the left column of our web page, or directly at *http://www.crh.noaa.gov/arx/?n=events.*

Decision Support Update (continued from page 1)

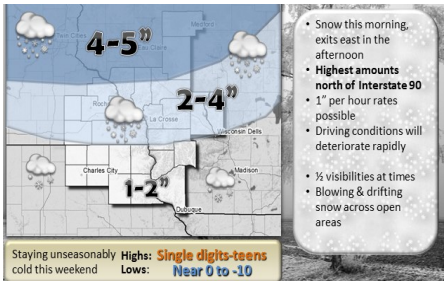
typically between 30 and 60 people. The webinars might cover weather events like potential severe thunderstorm activity, tornadoes, flooding, extreme heat, or significant winter weather.

Social Media: Facebook, Twitter and YouTube are all public forums where we are expanding our presence. Each of these forums can be very effective in expanding the reach of our information-sharing DSS efforts. See the article on page 2 for more information on our social media activities.

Graphical Short Term Forecasts: The La Crosse NWS has also begun using graphical short term forecasts on our web page as another way to alert our partners and the public of significant short term weather changes. Created as a single graphic, these forecasts are typically valid for an hour or two and might display updates on storms, heavy snow bands, or any variety of expected weather changes.

Graphical forecasts can easily provide a "vision" of what the weather is doing (or is expected to do) over the next few hours. These graphics might also aid partners as decision support inputs.

Multimedia Video Briefings: Starting in 2014, the staff at NWS La Crosse will create 3-5 minute multimedia videos to provide weather updates and trends for significant or impactful weather. These videos will be posted to our YouTube channel (*www.youtube.com/NWSLaCrosseWI*) and linked to our web page news stories and social media posts.



Graphical short term forecasts provide both a "picture" of the expected weather and information on possible impacts.

These types of videos will cover current weather, forecast conditions, and the expected impact on the public, and may be viewed at your convenience. Look for this useful, new information!

July 22nd "Refuge" Tornado – The Importance of Storm Spotters

On July 22, 2013, scattered severe thunderstorms moved across southeast Minnesota into far western Wisconsin. The possibility of severe storms was forecast, but there was considerable uncertainty regarding the overall tornado threat from these storms.

As the storms rolled through the Winona, Minnesota area, they grew in intensity, enough to prompt Severe Thunderstorm Warnings for the possibility of large hail and gusty winds. Storm spotters in the Winona area were active and reporting back to the La Crosse NWS in real-time. These types of reports are valuable in the overall warning program, providing confirmation of threats and background information our meteorologists can compare with the imagery they see on radar.

During this process, as storms moved over the Mississippi River valley along the Minnesota-Wisconsin border, spotters began providing keys to tornado development, including reports of a wall cloud, rotation, and large hail. Meteorologists at the La Crosse NWS office were able to focus on this storm based on those reports and upgrade our warnings to a Tornado Warning as the storm moved into the Trempealeau Wildlife Refuge on the Wisconsin side. Spotters on the Minnesota and Wisconsin sides of the river reported seeing the funnel and associated tornado, even though it was short-lived and there was no discernable radar signature indicating the presence of a tornado.

The EF0 tornado (winds of 70-75 mph) briefly moved from the river channel to shore, mainly damaging trees and water plant life.

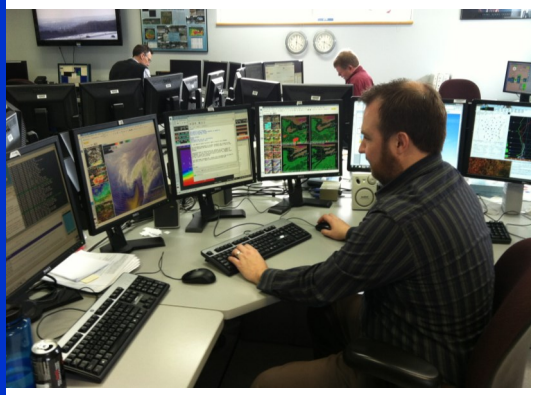
This is just another example of how valuable storm spotter reports are to the warning process. In situations of high impact, the addition of accurate spotter reports to the NWS suite of radar imagery and other information, can lead to better and more timely warnings. Ultimately, this process can save lives.

Wall cloud prior to the tornado, as viewed from Winona.

Tornado over the Trempealeau Wildlife Refuge. Photo courtesy of John Redig.

AWIPS-2: Open Architecture to Add Future Flexibility

In November 2013, the La Crosse NWS became the ninth office in the nation to install the second generation Automated Weather and Information Processing System (AWIPS-2) for weather forecasting. This system modernized the previous software (AWIPS-1) by incorporating an 'open architecture' structure, which allows the integration and display of a broad array of weather information over the coming decade. The open architecture structure also enables the local staff to alter and build the system for the unique challenges of the region (or local area), while increasing adaptability to future emerging technologies. AWIPS-1 was considered more of a 'closed system', as it didn't use modern computing hardware effectively, and didn't allow very much flexibility for future improvements or enhancements.



Lead Forecaster Tim Halbach (foreground), Hydrologist Mike Welvaert (back right) and Science Officer Dan Baumgardt (back left), utilize AWIPS-2 to prepare the forecast information suite on February 4, 2014.

The installation of the new system took one full day, with local area forecast services provided by the NWS Office in Des Moines, Iowa. (Des Moines provides backup forecast services for the La Crosse service area during emergency failures and hardware/software installations). By the end of the day, NWS La Crosse had resumed forecast responsibility for the local area, including all watch, warning, and advisory services.

"The AWIPS-2 system will enable NWS offices to incorporate and adapt to emerging technology and communication streams to enhance our mission of saving lives."

For the first week after the installation of AWIPS-2, the NWS La Crosse staff worked toward re-establishing many functionalities that did not transfer directly from AWIPS-1 to AWIPS-2. By the end of November, an estimated 90% of the functionality had been rebuilt. Because the NWS La Crosse was only the 9th office nationally to install the software, a 30-day stability test must be completed before the next wave of NWS offices install AWIPS-2.

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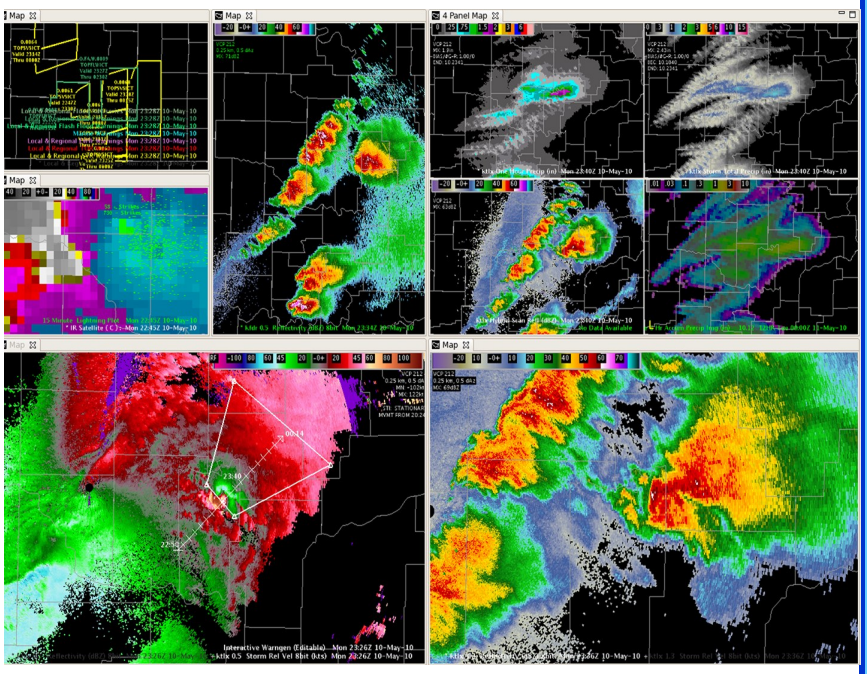
AWIPS-2 (continued from page 4)

One advantage of AWIPS-2 is the ability to display more information to the forecaster. In AWIPS-1, forecasters were limited to 4-panels of data for display at a given time. With AWIPS-2, the sky is the limit. The figure at the right illustrates a thunderstorm display a forecaster might use in AWIPS-2 for a supercell tornado day. Radar reflectivity and wind velocities, the warning-creation polygon software, satellite imagery, cloud-to-ground lightning strikes, current warnings, and rainfall information are all placed in front of the forecaster for interrogation. Many of these 'multiple pane' displays can be running on a single workstation, allowing the forecaster to visualize, interrogate, and forecast impacts more effectively.

The possibilities with the new AWIPS-2 system are virtually endless. One day, live storm spotter video feeds may be included in a pane adjacent to radar data. While it is difficult to visualize the future, the AWIPS-2 system will enable NWS Offices to incorporate and adapt to emerging technology and communication streams to enhance our mission of saving lives.



Sample display from AWIPS-2. This system allows forecasters to have many fields displayed on their desktop at one time. This makes it easier for forecasters to interrogate and assimilate the available information while producing day-to-day or critical weather information for public dissemination and access.

Awards, Recognition and Personnel Changes

2013 marked another year where NWS La Crosse staff members provided significant service to the broad agency mission through special program activities. Two of our staff members received the prestigious NOAA Administrator's Award this past August in recognition of their exceptional contributions. The NOAA Administrator's Award recognizes employees who have demonstrated exceptional leadership, skill, and ingenuity in their contributions that bring unusual credit to NOAA.

Two of our staff members received the prestigious NOAA Administrator's Award this past August in recognition of their exceptional contributions.

Information Technology Officer Matt Davis received the award for "the development, implementation, and maintenance of the Iris database, and associated tools and functions." Matt led a team of NWS programmers who provided an exceptional tool for operational personnel to monitor and manage information. The Iris database (as its associated display system) is a key component to maximizing situation awareness among the operational personnel and simplifying data access and product development processes.

Lead Forecaster Andy Just received the award for "exceptional work in implementing a new, efficient, collaborated and accurate medium range forecast methodology at Weather Forecast Offices. " As a part of a team of forecasters in the NWS Central Region, Andy was a primary developer of technological capabilities which have enabled operational forecasters to utilize statistics and automated processes to provide high quality initial forecast grids in the extended forecast process (days 4 to 7). This technology has streamlined that forecast process, made it more accurate, and enhanced consistency of the forecasts between neighboring forecast offices—all of which provide improved service to our partners and customers.

There have not been any personnel changes during this past year. Though we have been short staffed, the federal budget challenges of this past year resulted in a halt to new hires agency-wide. This fiscally necessary action has created staffing shortages at many NWS offices, as well as in our headquarters offices.

With a new federal budget agreement this past month, there is hope that we will return to full staffing during this coming year. In any case, we *will* continue to ensure the best possible weather information service we can.

Andy Just and Matt Davis with their NOAA Administrator's Awards.

National Weather Service
La Crosse, WI

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http://weather.gov/lacrosse

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Our Mission

NWS Mission Statement

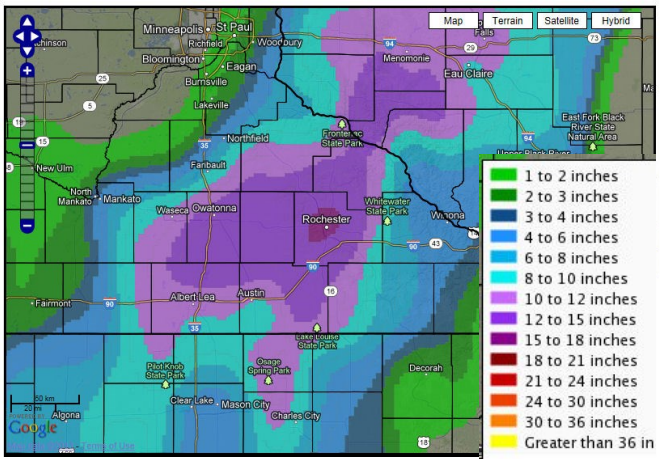
"Provide weather, hydrologic and climate forecasts and warnings …for the *protection of life and property* and enhancement of the national economy. NWS products and data form a national information database and infrastructure which can be used by others in the global community."

NWS La Crosse Mission Statement

"WFO La Crosse supports the NWS mission through continuous improvement in the provision of high quality forecast, warning, and decision support information for the safety and overall benefit of the citizens we serve."

Forecasting an Historic Late Spring Snow Event: May 2-3, 2013

The day was Wednesday, May 1, 2013. On the following day, Dodge Center, Minnesota would receive the greatest one-day, May snowfall in Minnesota's history. However, this day, May 1st, seemed fairly normal. Temperatures were in the low 50s in southeast Minnesota with partial sunshine, and near 60 degrees in western Wisconsin. A cold front passed through quietly late Wednesday, lowering temperatures into the 40s, and rain began falling in the evening. After midnight, heavy snow was falling and accumulating in northeast Iowa and southeast Minnesota. A band of 10-15" of snow was on the ground by sunrise Thursday.



Storm total snowfall from May 2-3, 2013.

This bus found the going rather difficult on May 2, 2013.

Many records were set for this late season snowstorm, including Dodge Center, Minnesota, which set the all-time Minnesota record for daily May snowfall of 15.4". Dodge Center also set the two-day May snowfall record for Minnesota with 17.4". Osage, Iowa, east of Mason City, recorded 13" of snow over May 2-3, setting a new May record for Iowa as well.

May 2nd Snowfall Records Set					
Dodge Center, MN	15.4"	Osage, IA	7.0"	Mondovi, WI	8.3"
Rochester, MN	14.0"	St Ansgar, IA	5.2"	Medford, WI	2.0"
Zumbro Falls, MN	10.4"	Elma, IA	2.1"	La Crosse, WI	0.8"
Austin, MN	10.0"	Charles City, IA	1.0"		
Byron, MN	9.6"				
Elgin, MN	7.4"				
Theilman, MN	6.2"				
Wabasha, MN	5.6"				
Grand Meadow, MN	5.0"				
Preston, MN	4.0"				
Lanesboro, MN	1.6"				
Spring Valley, MN	1.0"				

Numerous snowfall records were set across the area on May 2, 2014.

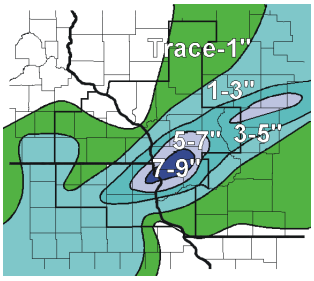
Forecasting a late spring, record snowfall is very difficult. Increasing intensity of the sun's incoming energy during May, road temperatures in the 40s and 50s, and warmer air temperatures all run contrary to the forecaster's idea that deeply accumulating snow could fall at that time of year.

To some extent, computer model forecasts can help with these scenarios, but they also have trouble simulating these complex interactions and don't typically provide forecasts of record snow. Our science keeps coming back to one big key to accumulating snow when conditions seem too warm: snowfall rate. It's pretty simple, really. Snow will accumulate if it falls at a faster rate than it melts. Surging moisture from a rich Gulf of Mexico air stream from the south, interacting with a very narrow, intense band of lift, were the keys to producing the high snowfall rate. The snowfall rate was 1-2" per hour Wednesday night and early Thursday morning.

> ***"It's pretty simple, really. Snow will accumulate if it falls at a faster rate than it melts."***

The NWS La Crosse targets 20 hours of lead time for winter storm warnings. While advisories were issued 24 hours prior to the heavy snow accumulation, confidence only grew high enough to issue a warning around 3 pm Wednesday afternoon. This provided about 12-15 hours of lead time before dangerous conditions presented themselves Thursday morning. Difficult forecasts like this will often have shorter warning lead times. In this event, thousands lost power as the heavy snow brought down tree limbs and entire trees. Stranded vehicles, for those who ventured out, were common as well.

Heavy snowfall in May is very rare, but not unprecedented for the area. In 1947, 7 to 10" of snow fell on May 28-29 across northeast Iowa, and into southwest and central Wisconsin. The heaviest snowfall was 10" in Gays Mills, Wisconsin. The weight of the heavy snow caused severe damage to trees, bushes, and power and phone lines.



Snowfall totals from one of the latest recorded spring heavy snowfall events in the area: May 28-29, 1947.